CLAIMS

1. In a journal turning lathe for machining a work piece, the journal turning lathe including a pair of end brackets adapted to be secured to a cylindrical work piece at axially spaced locations and a plurality of guide rails extending between and supported by the end brackets in parallel relation to the work piece, said guide rails supporting a clamshell assembly which is adapted to be translated along the guide rails by at least one motor driven lead screw, said clamshell assembly being the type having a rotatable ring operatively coupled to a stationary ring, the rotatable ring carrying a tool slide holding a tool bit for machining the cylindrical work piece, wherein the improvement comprises:

an intermediate support bracket adapted to be inserted between said guide rails and the work piece at a location displaced from the end brackets for inhibiting flexure of the guide rails as the clamshell is translated there along.

2. The journal turning lathe as in claim 1 wherein the intermediate support bracket comprises:

a) a generally U-shaped frame having a base segment joining first and second upwardly extending arms;

b) a first removable clamp member attachable to said first and second arms adapted to engage a first pair of said plurality of guide rails, and

c) a second removable clamp member attachable to said base segment and adapted to engage a second pair of said plurality of guide rails.

3. The journal turning lathe in claim 2 and further including:

a) a plurality of threaded bores formed radially through the first removable clamp member and through said first and second arms; and

b) a plurality of threaded jack pads fitted individually into the threaded bores for centering the generally U-shaped frame on the cylindrical work piece.

4. The journal turning lathe as in claim 1 wherein:

a) the first arm has a first top edge surface with a first concave notch adapted to receive a first guide rail of the journal turning lathe; and the second arm has a second top edge surface with a second concave notch adapted to receive a second guide rail of the journal turning lathe; and

b) the base segment has a top surface having a third concave notch is disposed on a top surface of the base segment adjacent to the first arm for receiving a third guide rail of a journal turning lathe, a fourth concave notch disposed on the top surface of the base segment adjacent to the second arm, for receiving a fourth guide rail of the journal turning lathe, and a fifth concave notch disposed on the top surface of the base segment between the third and fourth concave notches.

5. The journal turning lathe as in claim 4 wherein the first clamp member has a first end and a second end, a front wall, a back wall, a top surface, and a bottom surface, and a length such that the first clamp member extends from an outer surface of the first arm to a an outer surface of the second arm, the first clamp member further having a first inverted notch disposed on the bottom surface of the first clamp member proximate the first end thereof and a second inverted notch disposed on the bottom surface of the first clamp member proximate the second end where the first inverted notch cooperates with the first concave notch to form a first bore for capturing the first guide rail, and the second inverted notch and the second concave notch cooperate to form a second bore for capturing a second guide rail.

6. The journal turning lathe in claim 4 wherein:

a) the second clamp member has a first end and a second end, a front wall, a back wall, a top surface and a bottom surface, where the second clamp member extends between an inside surface of the first arm and an inside surface of the second arm, the second clamp member further having a third inverted notch on the bottom surface thereof proximate the first end and a fourth inverted notch on the bottom surface thereof proximate the second end where the third inverted notch cooperates with the third concave notch to form a third bore for capturing a third guide rail, and the fourth inverted notch cooperates with the fourth concave notch to form a fourth bore for capturing the fourth guide rail, and a fifth concave notch disposed between the third and fourth inverted notches cooperates with the fifth concave notch to loosely surround a drive shaft of the journal turning lathe with a predetermined clearance; and

b) jack pads adjustably disposed in threaded bores formed radially though the U-shaped frame and first clamp member for concentrically mounting the intermediate mounting brace on the cylindrical work piece.

7. The journal turning lathe as in claim 2 where the base segment is integral with the first and second upwardly extending arm segments.

8. The journal turning lathe as in claim 4 where the first concave notch is formed inwardly in of the first top edge surface.

9. The journal turning lathe as in claim 4 where the first, second, third and fourth concave notch is generally semi-circular in shape.

10. The journal turning lathe as in claim 4 where the first, second, third and fourth concave notch extends from a front wall to a back wall of the U-shaped frame.

11. The journal turning lathe as in claim 4 where the second concave notch is formed inward of the second top edge surface.

12. The journal turning lathe as in claim 4 where the third concave notch is formed inward of the top surface of the base segment adjacent the first arm segment.

13. The journal turning lathe as in claim 4 where the fourth concave notch is formed inward of the top surface of the base segment adjacent the second arm segment.

14. The journal turning lathe as in claim 4 where the fifth concave notch is generally semi-circular in shape.

15. The journal turning lathe as in claim 4 wherein the fifth concave notch is formed inward of the top surface of the base segment and extends from a front wall to a back wall of the U-shaped frame.

16. The journal turning lathe as in claim 5 where the first clamp member has a rounded arch between the first and second ends.

17. The journal turning lathe as in claim 16 where the rounded arch is integral with the first and second end of the first clamp member.

18. The journal turning lathe as in claim 5 where the first clamp member has an abutment for

resting the first clamp member on the U-shaped frame.

19. The journal turning lathe as in claim 18 where the abutment rests on a first and second shelf integrated with the first and second arm segment, respectively.

20. The journal turning lathe as in claim 5 where the first and second inverted notches are formed inward of a bottom surface of the first clamp member extend from the front wall to the back wall and are generally semi-circular in shape.

21. The journal turning lathe as in claim 6 where the third inverted notch is generally semi-circular in shape, is formed inward of the bottom surface of the second clamp member.

22. The journal turning lathe as in claim 21 where the third inverted notch extends from the front wall to the back wall of the second clamp member.

23. The journal turning lathe as in claim 6 where the fourth inverted notch is generally semi-circular in shape, is formed inward of the bottom surface of the second clamp member and extends from the front wall to the back wall of the second clamp member.

24. An intermediate support brace for a journal turning lathe for machining a cylindrical work piece, the journal turning lathe being of a type including a pair of end brackets adapted to be secured to the cylindrical work piece and a plurality of guide rails extending between the end brackets in parallel relation to the cylindrical work piece, said guide rails supporting a clamshell assembly that is adapted to be translated along the guide rails by at least one motor driven lead screw, said clamshell assembly having a rotatable ring operatively coupled to a stationary ring, the rotatable ring carrying a tool slide holding a tool bit for machining the cylindrical work piece, wherein the support brace comprises:

a) a generally U-Shaped frame having a first and second of upwardly extending arm segments joined by a base segment where

i) the first arm segment has a first top edge surface with a first concave notch adapted to receive a bottom surface of a first guide rail of the journal turning lathe;

ii) the second arm segment has a second top edge surface with a second concave notch adapted to receive a second guide rail of the journal turning lathe;

iii) the base segment has a top surface where a third concave notch is disposed on the top surface of the base segment adjacent to the first arm segment for receiving the bottom surface of a third guide rail of a journal turning lathe, a fourth concave notch is disposed on the top surface of the base segment adjacent to the second arm segment, for receiving the bottom surface of a fourth guide rail, and a fifth concave notch disposed on the top surface of the base segment between the third and fourth concave notches;

b) a first and second clamp member where:

i) the first clamp member has a first end and a second end, a front wall, a back wall, a top surface, and a bottom surface, where the first clamp member extends from an outer surface of the first arm segment to a an outer surface of the second arm segment, the first clamp member further having a first inverted notch disposed on the bottom surface of the first clamp member proximate the first end and a second inverted notch disposed on the bottom surface of the first clamp member proximate the second end where the first inverted notch cooperates with the first concave notch to form a first bore for capturing the first guide rail, and the second inverted notch and the second concave notch cooperate to form a second bore for capturing a second guide rail,

ii) the second clamp member has a first end and a second end, a front wall, a back wall, a top surface and a bottom surface, where the second clamp member extends between an inside surface of the first arm segment and an inside surface of the second arm segment, the second clamp member further having a third inverted notch on the bottom surface thereof proximate the first end and a fourth inverted notch on the bottom surface thereof proximate the second end where the third inverted notch cooperates with the third concave notch to form a third bore for capturing a third guide rail, and the fourth inverted notch cooperates with the fourth concave notch to form a fourth bore for capturing the fourth guide rail, and a fifth concave notch disposed between the third and fourth inverted notches cooperates with the fifth concave notch to surround a drive shaft of the journal turning lathe with a predetermined clearance; and

c) adjustable jack pads disposed in threaded bores formed radially though the U-shaped frame and first clamp member for concentrically mounting the intermediate mounting brace on the cylindrical work piece.

25. The intermediate support brace in claim 24 where the base segment is integral with the first and second upwardly extending arm segments.

26. The intermediate support brace in claim 24 where the first concave notch is formed inwardly in of the first top edge surface, is generally semi-circular in shape, and extends from a front wall to a back wall of the U-shaped frame.

27. The intermediate support brace in claim 24 where the second concave notch is formed inward of the second top edge surface, extends from a front wall to a back wall of the U-shaped frame, and is generically semi-circular in shape.

28. The intermediate support brace in claim 24 wherein the third concave notch is generally semi-circular in shape, is formed inward of the top surface of the base segment adjacent the first arm segment, and extends from a front wall to a back wall of the U-shaped frame.

29. The intermediate support brace in claim 24 where the fourth concave notch is generally semi-circular in shape, is formed inward of the top surface of the base segment adjacent the second arm segment, and extends from a front wall to a back wall of the U-shaped frame.

30. The intermediate support brace in claim 24 where the first clamp member has a rounded arch between the first and second ends.

31. The intermediate support brace in claim 30 where the rounded arch is integral with the first and second end of the first clamp member.

32. The intermediate support brace in claim 24 where the first clamp member has an abutment for resting the first clamp member on the U-shaped frame.

33. The intermediate support brace in claim 32 where the abutment rests on a first and second shelf integrated with the first and second arm segment, respectively.

34. A method of machining a cylindrical work piece *in situ* comprising the steps of:

a) providing a journal turning lathe of the type including first and second end brackets adapted to be concentrically mounted on the cylindrical work piece with a predetermined axial spacing therebetween, a plurality of guide rails extending between the first and second end brackets in parallel relation to the cylindrical work piece, a motor driven clamshell lathe assembly slidably mounted on and supported by the plurality of guide rails, and means for translating the clamshell lathe assembly axially along said guide rails;

b) mounting the journal turning lathe on the cylindrical work piece with the clamshell lathe assembly positioned proximate to the first end bracket;

c) providing an intermediate support bracket having a central opening adapted to receive the cylindrical work piece therethrough, the support bracket including a plurality of jack pads for centering the intermediate support bracket on the cylindrical work piece and clamping means for releasably securing the intermediate support bracket onto said plurality of guide rails at a predetermined location along said guide rails;

d) concentrically mounting the intermediate support bracket on the cylindrical work piece at said predetermined location;

e) clamping the intermediate support bracket to the plurality of guide rails;

f) translating the clamshell lathe assembly from said position proximate the first end bracket;

g) stopping translation of the clamshell late assembly at a position immediately adjacent the intermediate support bracket;

h) removing the intermediate support bracket from the cylindrical work piece and repositioning the intermediate support bracket on said cylindrical work piece immediately upstream of the clamshell lathe assembly; and

i) resuming translation of the clamshell lathe assembly to a position proximate the second end bracket.

35. A method of machining a cylindrical work piece *in situ* comprising the steps of:

a) providing a journal turning lathe of the type including first and second end brackets adapted to be concentrically mounted on the cylindrical work piece with a predetermined axial spacing therebetween, a plurality of guide rails extending between the first and second end brackets in parallel relation to the cylindrical work piece, a motor driven clamshell lathe assembly slidably mounted on and supported by the plurality of guide rails, and means for translating the clamshell lathe assembly axially along said guide rails;

b) mounting the journal turning lathe on the cylindrical work piece with the clamshell lathe assembly positioned proximate to the first end bracket;

c) providing a first and second intermediate support bracket having a central opening adapted to receive the cylindrical work piece therethrough, the support bracket including a plurality of jack pads for centering the intermediate support bracket on the cylindrical work piece and clamping means for releasably securing the intermediate support bracket onto said plurality of guide rails at a predetermined location along said guide rails;

d) concentrically mounting the first intermediate support bracket on the cylindrical work piece at said predetermined location;

e) clamping the first intermediate support bracket to the plurality of guide rails;

f) translating the clamshell lathe assembly from said position proximate the first end bracket;

g) stopping translation of the clamshell lathe assembly at a position immediately adjacent the intermediate support bracket;

h) concentrically mounting the second intermediate support bracket on the cylindrical work piece immediately upstream of the clamshell lathe assembly;

i) clamping the second intermediate support bracket to the plurality of guide rails;

j) removing the first intermediate support bracket from the cylindrical work piece; and

j) resuming translation of the clamshell lathe assembly to a position proximate the second end bracket.